



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. _____

1. State Building Code to be Amended:

- ☐ International Building Code
- ☐ ICC ANSI A117.1 Accessibility Code
- ☐ International Existing Building Code
- ☐ International Residential Code
- ☐ International Fire Code
- ☐ Uniform Plumbing Code

X International Mechanical Code

- ☐ International Fuel Gas Code
- ☐ NFPA 54 National Fuel Gas Code
- ☐ NFPA 58 Liquefied Petroleum Gas Code
- ☐ Wildland Urban Interface Code

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): **Section 401**

Title: **General**

2. Proponent Name (Specific local government, organization or individual):

Proponent: **Michael Lubliner**

Title: **SBCC Ventilation TAG member**

Date: **March 1, 2022**

3. Designated Contact Person:

Name: **Michael Lubliner**

Title: **SBCC Ventilation TAG member**

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4. Proposed Code Amendment.

User note:

About this chapter: Chapter 4 intends to provide an indoor atmosphere that protects the health and well-being of building occupants. Both mechanical and natural ventilation are addressed. Mechanical ventilation provides what is considered to be acceptable indoor air quality. Mechanical ventilation minimizes adverse health effects and provides an atmosphere that generally is not objectionable to occupants.

SECTION 401 GENERAL

401.1 Scope. This chapter shall govern the ventilation of spaces within a building intended to be occupied. Mechanical exhaust systems, including exhaust systems serving clothes dryers and cooking *appliances*; hazardous exhaust systems; dust, stock and refuse conveyor systems; subslab soil exhaust systems; smoke control systems; energy recovery ventilation systems and other systems specified in Section 502 shall comply with Chapter 5.

401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403. Where the air infiltration rate in a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2-inch water column (50 Pa) in accordance with Section R402.4.1.2 of the *International Energy Conservation Code*, the dwelling unit shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 occupancies *Dwelling units complying with the air leakage requirements of the International Energy Conservation Code or ASHRAE 90.1 shall be ventilated by mechanical means in accordance with Section 403. Ambulatory care facilities and Group I-2 occupancies shall be*

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ventilated by mechanical means in accordance with Section 407.

Code(s): International Mechanical Code
Section(s): 401 General

New Proposed Text: (to go below Section 401 GENERAL)

Low rise multi-family R2 dwelling units complying with the mechanical ventilation system requirements of this code (Washington Amendments to the IMC) shall allow the use of ASHRAE Standards 62.2-2019 as an acceptable option for compliance.

Exception: In all cases when 62.2 is used as the compliance path, the whole house ventilation system shall be a balanced system (see definition of balanced system)

2021 CODE: R202 Definitions.

BALANCED VENTILATION SYSTEM. A ventilation system where the total supply airflow and total exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the supply and exhaust airflows.

- 5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.** Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

- The proposal is an option, for those seeking higher ventilation rates to further improve IAQ in accordance with ASHRAE Standard 62.2. Higher ventilation rates can dilute and thereby reduce indoor air pollutants beyond the current IMC-WA rate options.
- The use of 62.2 as an alternative will help avoid confusion and duplication of efforts, when builders seek to comply with requirements for high performance voluntary programs such as; USEPA Energy Star, EPA Indoor Air Plus, Passive House and IRS-45L for new home builder tax credits.
- Allowing 62.2 as an option provides a acknowledged path for WA builders who desire using. Note that IMC already references ASHRAE 62.1 for nonresidential dwelling units.
- This proposal seeks to clarify that 62.2-2019 can be used for low-rise R2 multifamily dwellings, provided that a balanced ventilation systems as is currently required in IMC-WA amended is employed. This proposal seeks to require the use of a balanced system, when using the 62.2-2019 option is taken.
- Justification for this proposal is discussed in WSEC-R training:

6. Specify what criteria this proposal meets. You may select more than one.

- ☒ The amendment is needed to address a critical life/safety need.
- ☐ The amendment clarifies the intent or application of the code.
- ☐ The amendment is needed to address a specific state policy or statute.
- ☐ The amendment is needed for consistency with state or federal regulations.
- ☐ The amendment is needed to address a unique character of the state.
- ☒ The amendment corrects errors and omissions.

7. Is there an economic impact: ☒ No

If no, state reason: **This is an option for achieving acceptable IAQ using mechanical ventilation standard 62.2-2019. The use of current approaches for mechanical ventilation are still allowed.**

- a. **Code Enforcement.** List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application: **NONE**

Note: The AHJ should be already verify ventilation systems requirements at the plan review and field verification/commissioning phases of inspection. Training ventilation system sizing and commissioning is available from WSU Energy Program Web WSEC-R Web page:

<https://www.energy.wsu.edu/EventsTrainings.aspx>

<https://www.energy.wsu.edu/BuildingEfficiency/EnergyCode.aspx#Permit>

The Code Compliance Calculator can be used to size the ventilation system:

[Code Compliance Calculator](#) and [readme](#)

• **Video training:**

- [Introduction to the C3 Calculator](#) (9 min)
- [Using the C3 Calculator: Small Addition with User-defined Baseline](#) (16 min)
- [Entering Custom Values in the Databases & Creating a "Glazing Schedule"](#) (7 min)
- [Using C3 to print PDF forms](#) (9 min)
- [Using the C3 Calculator to Calculate Ventilation Rates](#) (10 min)
- [Filling out the Compliance Certificate for Ventilation Systems](#) (10 min)

See WSU Energy Program Training Videos (10 minutes each) and available at:

Calculating Ventilation Rates:

<https://www.youtube.com/watch?v=IGu0HS0V5UU>

Filling Out the Compliance Certificate for Ventilation Systems:

<https://www.youtube.com/watch?v=C2W6mP9Mts4>

See Code Compliance Calculator (C3) form at:

https://www.energy.wsu.edu/Documents/Certificate%202018%20WSEC_rev%207-21-21.pdf

Compliance Certificate

The certificate should be completed by the builder or other approved party and posted in the space where the furnace is located, a utility room, or another approved location in the building.

 [2018 WSEC Compliance Certificate](#)

 [2018 Compliance Certificate - Instructions](#)

WSU-Low-rise multifamily ventilation training Dr. Iain Walker:

[2020-10-15 SeaBEC Meeting - YouTube](#)

WSU-Low-rise multifamily ventilation training Mike Lubliner:

https://energy.wsu.edu/videos/wsec_2018-residential_updates_20200716/

| HVAC System Duct Leakage Testing (R403.3) | | Circle one |
|---|----------------------|------------|
| All ductwork and air handler in conditioned space? (See Option 4.2) | | Y or N |
| All ductwork in unconditioned spaces buried and tested at 3% total leakage, and air handler in conditioned space? (See Option 4.1.) | | Y or N |
| All ductwork & air handler outside conditioned space insulated to minimum R-8? | | Y or N |
| Air handler present at duct leakage test? (Total leakage 4% if yes, 3% if no) | | Y or N |
| HVAC leakage to outside test conducted at final? | | Y or N |
| Do HVAC duct leakage tests include GPS and time stamp verification? | | Y or N |
| HVAC system leakage test calculated design target: | _____ CFM @ 25 Pa | |
| HVAC system leakage test measured results: | _____ CFM @ 25 Pa | |
| Building Leakage Testing (R402.4.1.2) | | |
| Dwelling unit leakage test calculated design target: | _____ ACH @ 50 Pa | |
| Dwelling unit leakage test, measured results: | _____ ACH @ 50 Pa | |
| Whole Building Leakage test (R2 corridor only) design target: | _____ CFM/sf @ 50 Pa | |
| Whole Building Leakage test (R2 corridor only) measured: | _____ CFM/sf @ 50 Pa | |
| Do building leakage tests include GPS and time stamp verification? | | Y or N |
| Whole House Ventilation System Measured Flow Rates (M1505.4 IRC-WA) | | Circle one |
| Are the system controls correctly labeled? | | Y or N |
| The Whole House Ventilation (WHV) system operation and maintenance (O&M) instructions were provided to the building owner? | | Y or N |
| Provided to: _____ on _____ (date) | | |
| Whole House Ventilation System Type: (Circle one) | | |
| (1) Whole house exhaust fan, location _____ | | |
| (2) Balanced HRV/ ERV, location _____ | | |
| For R2 low-rise, serves more than one unit? _____ Y or N | | |
| (3) Supply or HRV WHV integral to the air handler. Describe system control sequence of operations or reference to design submittal: _____ | | |
| Specify run-time: _____ hours per day _____ CFM | | |
| WHV calculated design minimum flow rate per plan submittal: _____ | | |
| WHV measured min flow rate at commissioning: Exhaust _____ CFM, Supply _____ CFM | | |
| Do WHV flow tests include GPS & time stamp verification? | | Y or N |
| HRV/ERV sensible heat recovery efficiency: _____ | | |
| Commissioning Notes: | | |
| | | |
| Other Mandatory Requirements | | Circle one |
| All other mandatory requirements of WSEC-R have been met? | | Y or N |

- b. **Small Business Impact.** Describe economic impacts to small businesses: **NONE**
- c. **Housing Affordability.** Describe economic impacts on housing affordability: **NONE**
- d. **Other.** Benefits to owners, to occupants, to the public, to the environment, and to other stakeholders is expanded and summarized here:
- The proposal is a clear defined option, for those seeking higher ventilation rates to further improve IAQ in accordance with ASHRAE Standard 62.2. Note that IMC already references ASHRAE 62.1 for nonresidential dwelling units.
 - Higher ventilation rates can dilute and thereby reduce indoor air pollutants beyond the current IMC rate options.

- **Reduced IAQ pollutants saves on health care costs to the dwelling occupants and society.**
- **Higher dilution of moisture generated by occupants and other sources reduces risk for condensation and help reduce mold, building structural decay and maintenance/repair expenses.**
- **The use of 62.2 as an alternative will help avoid confusion and duplication of efforts, when used by builders for high performance voluntary programs such as USEPA Energy Star, EPA Indoor Air Plus, and Passive House and IRS-45L for new home builder tax credits. IRS 45L and WA utility incentives may help reduce the first cost of the home and improve purchase affordability.**
- **This proposal seeks to clarify that 62.2-2019 can be used for low-rise R2 multifamily dwellings, provided that a balanced ventilation systems as is currently required in IMC-WA amended is employed. This proposal seeks to require the use of a balanced system, when using the 62.2-2019 option is taken.**

Please send your completed proposal to: sbcc@des.wa.gov

This slide shows below a typical balanced ventilation system employed in 62.2-2019 (credit ASHRAE 62.2 user manual):

ASHRAE 62.2-2019 User Manual – Central HRV/ERV – Balanced System

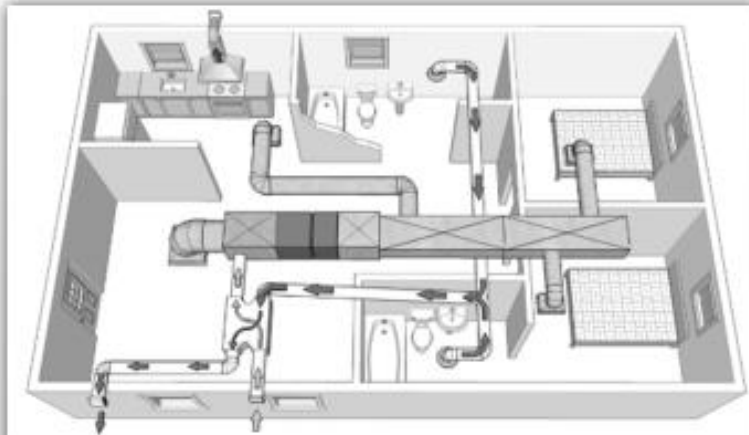
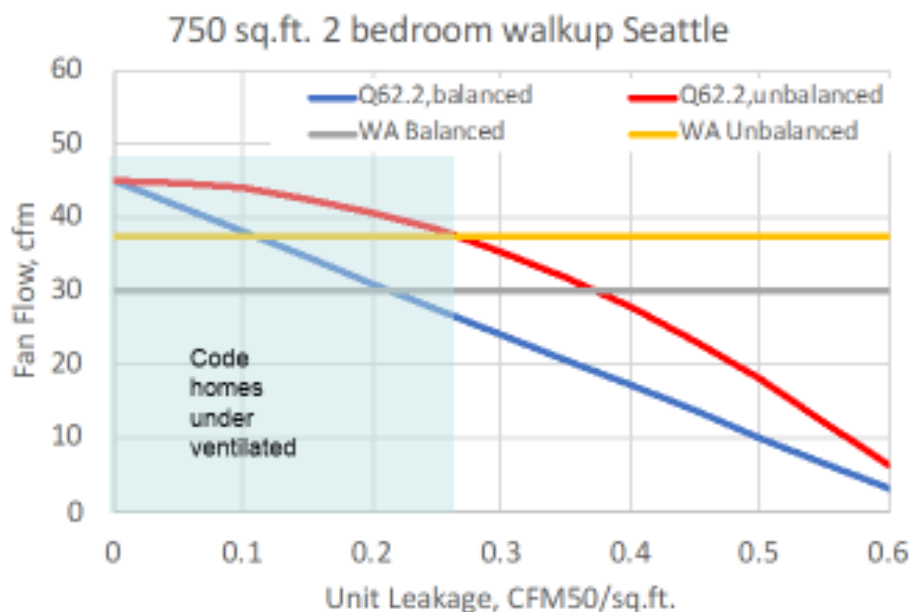


Figure 4-E Combination ventilation system with HRV or ERV continuously exhausting indoor air from bathrooms and introducing outdoor air into an air handler's return.

This slide below shows the difference in ventilation rates between IMC-WA and ASHRAE 62.2 for a balanced ventilation system sized for each apartment.

Combining natural infiltration and mechanical ventilation: : Multi-Family Example



This individual unit leakage metric very different requirement c/w whole building

